

### **New developments in Local Area Helioseismology**

*T.L. Duvall Jr.*

*NASA/Goddard Space Flight Center, USA*

Several techniques are used to study local areas in helioseismology, including time-distance helioseismology, acoustic imaging/holography, and ring diagram analysis. These techniques can be used to study flows, magnetic fields, and temperature inhomogeneities. The "local" area studied can be as small as a supergranule, or as large as the entire convection zone in the case of meridional circulation as studied by Giles and colleagues. Active regions have been studied with some interesting results, with complicated flow patterns below sunspots and detectable sound speed inhomogeneities in the 10 Mm below the spots.

Another interesting result is the detection of sunspots on the back side of the Sun by Lindsey and Braun using the holography technique. A confirmation of their result using the time-distance technique will be discussed.